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EXAMINER	
ROBERTS, MICHAEL P	

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2873	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/813,620	KLYCE ET AL.
	Examiner	Art Unit
	Michael P. Roberts	2873

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-25 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-25 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 15 September 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 20040430 and 20040331.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. **Claims 1-3, 5-8, 10-14, and 16-25** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The claims are directed to a judicial exception; as such, pursuant to the Interim Guidelines on Patent Eligible Subject Matter (MPEP 2106), the claims must have either a physical transformation and/or a useful, concrete and tangible result. The claims fail to include transformation from one physical state to another. Although the claims appear useful and concrete, there does not appear to be a tangible result claimed. Merely determining plural indexes would not appear to be sufficient to constitute a tangible result, since the outcome of the determining plural indexes step has not been used in a disclosed practical application nor made available in such a manner that its usefulness in a disclosed practical application can be realized. As such, the subject matter of the claims is not patent eligible.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. **Claims 1-6, 8, 10, 20-21, and 23-24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujieda '697 (US 5,500,697) in view of Smolek (Michael K. Smolek et al. "Current Keratoconus Detection Methods Compared with Neural Network Approach", Investigative Ophthalmology & Visual Science, October 1997, Vol. 38, No. 11, pp. 2290-2299).

Regarding **claim 1**, Fujieda '697 discloses a corneal topography analysis system (col. 2, line 42-col. 3, line 35) comprising: an input unit for inputting corneal curvature data (Figs. 8,10; col. 7, line 51-col. 8, line 24; col. 9, lines 21-35, wherein the detection optical system for measuring cornea curvature inputs the signal from the CCD camera 57 to a frame memory 102, which gets input to a synthesizing circuit 104 under control by the first microcomputer 103); and an analysis unit that determines plural indexes characterizing topography of the cornea based on the input corneal curvature data (Fig. 10-13; col. 11, line 14-col. 12, line 57, wherein microcomputer 103 determines plural indexes such as corneal refractive power and cornea shape based on the input corneal curvature signal), the analysis unit further judges corneal topography to judge a normal cornea, corneal astigmatism, or other classification of corneal topography such as hypermetropia and myopia (col. 12, line 35-col. 13, line 33), but does not specifically disclose

that the analysis unit further judges corneal topography from features inherent in predetermined classifications of corneal topography using the determined indexes and a neural network. In the same field of endeavor of corneal topography analysis systems, Smolek teaches of a corneal topography analysis system wherein an analysis unit judges corneal topography from features inherent in predetermined classifications of corneal topography using determined indexes and a neural network (pg 2291-2295, 2298, wherein the analysis judges corneal topography from features inherent in predetermined classifications of corneal topography – see especially col. 2, pg 2291 and col. 1, pg. 2292 – using determined indexes such as those listed in col. 2 of page 2292, and a neural network as seen in col. 2 of page 2292 and col. 1 of page 2298, so as to judge nine different corneal categories – see col. 1 on page 2292) for the purpose of accurately screening keratoconus and keratoconus suspect, as well as the severity of keratoconus (page 2298). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made for the corneal topography analysis system of Fujieda '697 to judge corneal topography from features inherent in predetermined classifications of corneal topography using the determined indexes and a neural network since Smolek teaches of a corneal topography analysis system wherein an analysis unit judges corneal topography from features inherent in predetermined classifications of corneal topography using determined indexes and a neural network for the purpose of accurately screening keratoconus and keratoconus suspect, as well as the severity of keratoconus.

Regarding **claim 2**, Fujieda '697 and Smolek disclose and teach of a corneal topography analysis system as shown above, and Smolek further teaches of a corneal topography analysis system wherein the analysis unit assigns a probability to the at least one classification of corneal

topography that has been judged (pg. 2292-2294, wherein the first network assigned a probability between 0 and 1 – 0 being a negative response and 1 being a positive response – to the presence of keratoconus, keratoconus suspect, and other confounding corneal topographies).

Regarding **claim 3**, Fujieda '697 and Smolek disclose and teach of a corneal topography analysis system as shown above, and Smolek further teaches of a corneal topography analysis system wherein the analysis unit grades the severity of keratoconus using one or more of the determined indexes (pg. 2292-2294, wherein the determined indexes were used as inputs for the second neural network which grades the severity of keratoconus).

Regarding **claim 4**, Fujieda '697 and Smolek disclose and teach of a corneal topography analysis system as shown above, and Fujieda '697 further discloses a display unit (91) for displaying results of judgments made by the analysis unit (Figs. 8,10; col. 12, lines 35-37).

Regarding **claim 5**, Fujieda '697 and Smolek disclose and teach of a corneal topography analysis system as shown above, and Smolek further teaches of a corneal topography analysis system wherein the analysis unit judges keratoconus cases from similarity to keratoconus and from severity of keratoconus (pg. 2291, col. 2-pg. 2293) using the determined indexes and the neural network (pg. 2292-2294, wherein the determined indexes were inputs for the neural networks).

Regarding **claim 6**, Fujieda '697 and Smolek disclose and teach of a corneal topography analysis system as shown above, and Fujieda '697 further discloses a corneal curvature measuring device comprising a Placido disk and an image taking device (Fig. 8; col. 7, line 51-col. 8, line 24, wherein the projection optical system for measuring corneal curvature comprises a Placido plate 51 and a CCD camera 57), and wherein the corneal curvature data is obtained by

projecting Placido rings onto the cornea and taking a Placido ring image from a convex surface of the cornea (col. 7, line 51-col. 8, line 24).

Regarding **claim 8**, Fujieda '697 and Smolek disclose and teach of a corneal topography analysis system as shown above, and Smolek further teaches of a corneal topography analysis system wherein the indexes found by said analysis unit include area compensated surface regularity index (pg. 2292, wherein an index extracted includes surface regularity index SRI).

Regarding **claim 10**, Fujieda '697 and Smolek disclose and teach of a corneal topography analysis system as shown above, and Fujieda '697 further discloses a measuring optical system that projects Placido rings onto the cornea and takes a Placido ring image formed by the convex surface of the cornea (Fig. 8; col. 7, line 51-col. 8, line 24, wherein the projection optical system for measuring corneal curvature projects Placido rings onto the cornea and takes an image formed by the convex surface of the cornea with the CCD camera 57); and a computational unit that obtains the corneal curvature data based on the Placido ring image taken by the measuring optical system (Fig. 10; col. 9, lines 36-40, wherein image processing circuit 106 conducts image processing to the Placido ring image stored in the frame memory 102).

Regarding **claim 20**, Fujieda '697 discloses a corneal topography analysis system (col. 2, line 42-col. 3, line 35) comprising: an input unit for inputting corneal curvature data (Figs. 8,10; col. 7, line 51-col. 8, line 24; col. 9, lines 21-35, wherein the detection optical system for measuring cornea curvature inputs the signal from the CCD camera 57 to a frame memory 102, which gets input to a synthesizing circuit 104 under control by the first microcomputer 103); and an analysis unit that determines plural indexes characterizing topography of the cornea based on the input corneal curvature data (Fig. 10-13; col. 11, line 14-col. 12, line 57, wherein

microcomputer 103 determines plural indexes such as corneal refractive power and cornea shape based on the input corneal curvature signal) to judge a plurality of classifications of corneal topography (col. 12, line 35-col. 13, line 33; wherein the analysis unit judges classifications such as normal cornea, corneal astigmatism, or other classification of corneal topography such as hypermetropia and myopia), but does not specifically disclose that the analysis unit further judges corneal topography from features inherent in predetermined classifications of corneal topography using the determined indexes. In the same field of endeavor of corneal topography analysis systems, Smolek teaches of a corneal topography analysis system wherein an analysis unit judges corneal topography from features inherent in predetermined classifications of corneal topography using determined indexes (pg 2291-2295, 2298, wherein the analysis judges corneal topography from features inherent in predetermined classifications of corneal topography – see especially col. 2, pg 2291 and col. 1, pg. 2292 – using determined indexes such as those listed in col. 2 of page 2292) for the purpose of accurately screening keratoconus and keratoconus suspect, as well as the severity of keratoconus (page 2298). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made for the corneal topography analysis system of Fujieda '697 to judge corneal topography from features inherent in predetermined classifications of corneal topography using the determined indexes since Smolek teaches of a corneal topography analysis system wherein an analysis unit judges corneal topography from features inherent in predetermined classifications of corneal topography using determined indexes for the purpose of accurately screening keratoconus and keratoconus suspect, as well as the severity of keratoconus.

Regarding **claim 21**, Fujieda '697 and Smolek disclose and teach of a corneal topography analysis system as shown above, and Fujieda '697 further discloses that the plurality of classifications are selected from normal cornea and corneal astigmatism (col. 12, line 35-col. 13, line 33). Smolek further teaches of the analysis system wherein the analysis unit judges the plurality of classifications of corneal topography using a neural network (pg. 2292), and wherein the plurality of classifications are selected from normal cornea, corneal astigmatism, keratoplasty, keratoconus, keratoconus suspect, pellucid and marginal degeneration (pg. 2292).

Regarding **claim 23**, Fujieda '697 discloses a method of analyzing corneal topography of a cornea (col. 2, line 42-col. 3, line 35) comprising the steps of: obtaining corneal curvature data (col. 7, line 51-col. 8, line 24); determining plural indexes characterizing topography of the cornea based on the obtained corneal curvature data (Fig. 10-13; col. 11, line 14-col. 12, line 57, wherein microcomputer 103 determines plural indexes such as corneal refractive power and cornea shape based on the input corneal curvature signal); and judging corneal topography so as to judge a normal cornea or corneal astigmatism (col. 11, lines 14-col. 12, line 34; col. 12, line 58-col. 13, line 33), but does not specifically disclose judging corneal topography from features inherent in predetermined classifications of corneal topography using the determined indexed and a neural network. In the same field of endeavor of corneal topography, Smolek teaches of judging corneal topography from features inherent in predetermined classifications of corneal topography using determined indexes and a neural network (pg 2291-2295, 2298, wherein the analysis judges corneal topography from features inherent in predetermined classifications of corneal topography – see especially col. 2, pg 2291 and col. 1, pg. 2292 – using determined indexes such as those listed in col. 2 of page 2292, and a neural network as seen in col. 2 of page

2292 and col. 1 of page 2298, so as to judge nine different corneal categories – see col. 1 on page 2292) for the purpose of accurately screening keratoconus and keratoconus suspect, as well as the severity of keratoconus (page 2298). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made for the method of analyzing corneal topography of Fujieda '697 to include the step of judging corneal topography from features inherent in predetermined classifications of corneal topography using the determined indexes and a neural network since Smolek teaches of a method of analyzing corneal topography comprising the step of judging corneal topography from features inherent in predetermined classifications of corneal topography using determined indexes and a neural network for the purpose of accurately screening keratoconus and keratoconus suspect, as well as the severity of keratoconus.

Regarding **claim 24**, Fujieda '697 and Smolek disclose and teach of a method of analyzing corneal topography as shown above, and Smolek further teaches of a method of analyzing corneal topography wherein the step of judging corneal topography includes judging keratoconus cases from similarity to keratoconus and from severity of keratoconus (pg. 2291, col. 2-pg. 2293) using the determined indexes and the neural network (pg. 2292-2294, wherein the determined indexes were inputs for the neural networks).

6. **Claims 7 and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujieda '697 in view of Smolek, as applied to independent **claims 1 and 20** above, and further in view of Bursell '001 (US 5,993,001).

Regarding **claims 7 and 22**, Fujieda '697 and Smolek disclose and teach of a corneal

topography analysis system as shown above, but do not specifically disclose or teach that the input unit and analysis unit operate independently of the corneal curvature measuring device so as to be operable for analysis of corneal topography data acquired by a plurality of systems. In the same field of endeavor of ophthalmic analysis systems, Bursell '001 teaches of an input unit and analysis unit that operate independently of an ophthalmic measuring device so as to be operable for analysis of ophthalmic data acquired by a plurality of systems (col. 4, lines 21-35; col. 5, lines 17-41; col. 6, line 45-col. 7, line 36, wherein the data collection unit 12 operates independently of the network 14 that inputs the data into the examination units 20A and 20B so as to be operable for analysis of ophthalmic data acquired by a plurality of other systems joined by the network 14) for the purpose of allowing an optometrist or trained technician in one location to take and transmit data while consulting in real time with a specialist who analyzes the data at another location (col. 2, lines 9-38). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made for the system of Fujieda '697 and Smolek to have the input unit and analysis unit operate independently of the corneal curvature measuring device so as to be operable for analysis of corneal topography data acquired by a plurality of systems since Bursell '001 teaches of an input unit and analysis unit that operate independently of an ophthalmic measuring device so as to be operable for analysis of ophthalmic data acquired by a plurality of systems for the purpose of allowing an optometrist or trained technician in one location to take and transmit data while consulting in real time with a specialist who analyzes the data at another location.

Fujieda '697, Smolek, and Bursell '001 disclose and teach of a corneal topography analysis system as shown above, but do not specifically disclose the plurality of other systems

including systems using placido disk technology with different ring structures and non-placido disk technology for capturing corneal data. However, it is well known in the art of corneal topography analysis to capture corneal curvature data with placido disk technology with different ring structures and non-placido disk technology for the purpose of having more options and perhaps obtaining more accurate results. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made for the corneal topography analysis system of Fujieda '697, Smolek, and Bursell '001 to disclose and teach of the plurality of other systems including systems using placido disk technology with different ring structures and non-placido disk technology for capturing corneal data since it is well known in the art of corneal topography analysis to capture corneal curvature data with placido disk technology with different ring structures and non-placido disk technology for the purpose of having more options and perhaps obtaining more accurate results.

7. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujieda '697 in view of Smolek, as applied to independent **claim 1** above, and further in view of Lai '535 (US 2005/0174535).

Regarding **claim 9**, Fujieda '697 and Smolek disclose and teach of a corneal topography analysis system as shown above, and Fujieda '697 further discloses the display unit (91) graphically represent the judged classifications of corneal topographies together with numerical values (Figs. 15-18; col. 12, line 40-col. 13, line 44, wherein astigmatism is graphically represented together with numerical values), but do not specifically disclose or teach of the display unit graphically representing probabilities of the judged classifications of corneal

topographies together with numerical values. In the same field of endeavor of ophthalmic analysis systems, Lai '535 teaches of graphically representing probabilities of judged classifications of ophthalmic properties together with numerical values (sec. 0028, 0051, 0058, wherein graphical representations representing the patient's quality of vision – wherein the lower the quality of vision represented graphically, the higher the probability of spherical aberrations, spherical refractive error, and the like – are displayed on display device 42 along with numerical values) for the purpose of analyzing the profile of the wavefront of light returned from the patient's eye, thus objectively analyzing the patient's quality of vision in order to identify a substantially optical vision correction lens for the patient (sec. 0027-0028). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made for the corneal topography analysis system of Fujieda '697 and Smolek to have the display unit graphically represent probabilities of the judged classifications of corneal topographies together with numerical values since Lai '535 teaches of graphically representing probabilities of judged classifications of ophthalmic properties together with numerical values for the purpose of analyzing the profile of the wavefront of light returned from the patient's eye, thus objectively analyzing the patient's quality of vision in order to identify a substantially optimal vision correction lens for the patient.

8. **Claims 14-17 and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujieda '697, in view of Mammone '859 (US 5,796,859), and further in view of Ruiz '451 (US 2002/0075451).

Regarding **claim 14**, Fujieda '697 discloses a corneal topography analysis system (col. 2,

line 42-col. 3, line 35) comprising: an input unit for inputting corneal curvature data (Figs. 8,10; col. 7, line 51-col. 8, line 24; col. 9, lines 21-35, wherein the detection optical system for measuring cornea curvature inputs the signal from the CCD camera 57 to a frame memory 102, which gets input to a synthesizing circuit 104 under control by the first microcomputer 103); a computational unit (Figs. 10-13; col. 9, line 21-col. 10, line 30, wherein the control system of the apparatus handles all computations); and an analysis unit for judging categories of corneal topographies based on converted corneal curvature data (col. 11, line 14-col. 12, line 39; col. 12, line 40-col. 13, line 33, wherein microcomputer 103 judges categories such as hypermetropia, astigmatism, and myopia based on corneal curvature data converted to a colored refractive power map), but does not specifically disclose that the computational unit removing high-frequency components from resulting data by frequency analysis. In the same field of endeavor of corneal topography systems, Mammone '859 teaches of removing high-frequency components from resulting data by frequency analysis (col. 2, lines 20-40, wherein a Fourier transform is performed) for the purpose of suppressing all side lobes and negative frequencies except for the fundamental spatial frequency to better map dioptric powers (col. 2, lines 20-40). Therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made for the corneal topography analysis system of Fujieda '697 to include a computational unit that removes high-frequency components from resulting data by frequency analysis since Mammone '859 teaches of removing high-frequency components from resulting data by frequency analysis for the purpose of suppressing all side lobes and negative frequencies except for the fundamental spatial frequency to better map dioptric powers.

Fujieda '697 and Mammone '859 disclose and teach of a corneal topography analysis system as shown above, but do not specifically disclose or teach of converting the corneal curvature data into a denser first matrix by interpolation, and converting produced data into corneal curvature data in the form of a second data matrix. In the same field of endeavor of optical topography systems, Ruiz '451 teaches of converting data into a first denser data matrix by interpolation (sec. 0035-0038, 0086-0087, wherein topography data is stored in the form of a data matrix and a fit reference sphere which can be an averaged or meridian sphere with respect to the actual topography, i.e. via interpolation, is determined), and converting produced data into corneal curvature data in the form of a second matrix (sec. 0086-0087, wherein the first data matrix is manipulated to achieve a desired profile, and that final profile is placed in a second matrix) for the purpose of storing the data in a form which is each to process by the data processing system (sec. 0035). Therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made for the corneal topography analysis of Fujieda '697 and Mammon '859 to include converting the corneal curvature data into a denser first matrix by interpolation, and converting produced data into corneal curvature data in the form of a second data matrix, since Ruiz '451 teaches of converting data into a first denser data matrix by interpolation, and converting produced data into corneal curvature data in the form of a second matrix, for the purpose of storing the data in a form which is each to process by the data processing system.

Regarding **claim 15**, Fujieda '697, Mammone '859, and Ruiz '451 disclose and teach of a corneal topography analysis system as shown above, and Fujieda '697 further discloses a display

unit (91) for displaying results of judgments made by the analysis unit (Fig. 8; col. 11, line 14-col. 12, line 39).

Regarding **claim 16**, Fujieda '697, Mammone '859, and Ruiz '451 disclose and teach of a corneal topography analysis system as shown above, and Fujieda '697 further discloses a corneal curvature measuring device comprising a Placido disk and an image taking device (Fig. 8; col. 7, line 51-col. 8, line 24, wherein the projection optical system for measuring corneal curvature comprises a Placido plate 51 and a CCD camera 57), and wherein the corneal curvature data is obtained by projecting Placido rings onto the cornea and taking a Placido ring image from a convex surface of the cornea (col. 7, line 51-col. 8, line 24).

Regarding **claim 17**, Fujieda '697, Mammone '859, and Ruiz '451 disclose and teach of a corneal topography analysis system as shown above, and Mammone '859 further teaches of removing the high-frequency components by fast Fourier transform (col. 2, lines 9-49, wherein the fast Fourier transform (FFT) is a discrete Fourier transform algorithm) and smoothes the corneal curvature data (col. 2, lines 9-49, wherein the spectrum is windowed and band-pass filtered to suppress all side lobes and negative frequencies except or the fundamental spatial frequency, i.e. smoothing the data).

Regarding **claim 19**, Fujieda '697, Mammone '859, and Ruiz '451 disclose and teach of a corneal topography analysis system as shown above, and Fujieda '697 further discloses a measuring optical system that projects Placido rings onto the cornea and takes a Placido ring image formed by the convex surface of the cornea (Fig. 8; col. 7, line 51-col. 8, line 24, wherein the projection optical system for measuring corneal curvature projects Placido rings onto the cornea and takes an image formed by the convex surface of the cornea with the CCD camera 57);

and a corneal curvature calculating unit that obtains the corneal curvature data based on the Placido ring image taken by the measuring optical system (Fig. 10; col. 9, lines 36-40, wherein image processing circuit 106 conducts image processing to the Placido ring image stored in the frame memory 102).

9. **Claim 25** is rejected under 35 U.S.C. 103(a) as being unpatentable over Mammone '859 in view of Ruiz '451.

Regarding **claim 25**, Mammone '859 discloses a method of analyzing corneal topography of a cornea (abstract) comprising the steps of: obtaining corneal curvature data (col. 2, lines 10-49; col. 3, line 17-col. 4, line 32, wherein an image of corneal topography is processed); removing high-frequency components from resulting data by frequency analysis (col. 2, lines 20-40, wherein a Fourier transform is performed to suppress all side lobes and negative frequencies except for the fundamental spatial frequency); and judging categories of corneal cases based on the converted corneal curvature data (col. 2, lines 10-49; col. 5, lines 31-53; col. 9, lines 44-55, wherein the refractive power at certain distances is determined), but does not specifically disclose converting the corneal curvature data into a denser first matrix by interpolation, and converting produced data into corneal curvature data in the form of a second data matrix. In the same field of endeavor of optical topography systems, Ruiz '451 teaches of converting data into a first denser data matrix by interpolation (sec. 0035-0038, 0086-0087, wherein topography data is stored in the form of a data matrix and a fit reference sphere which can be an averaged or meridian sphere with respect to the actual topography, i.e. via interpolation, is determined), and converting produced data into corneal curvature data in the form of a second matrix (sec. 0086-

0087, wherein the first data matrix is manipulated to achieve a desired profile, and that final profile is placed in a second matrix) for the purpose of storing the data in a form which is each to process by the data processing system (sec. 0035). Therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made for the method of analyzing corneal topography of Mammon '859 to include the steps of converting the corneal curvature data into a denser first matrix by interpolation, and converting produced data into corneal curvature data in the form of a second data matrix, since Ruiz '451 teaches of converting data into a first denser data matrix by interpolation, and converting produced data into corneal curvature data in the form of a second matrix, for the purpose of storing the data in a form which is each to process by the data processing system.

Examiner's Comment

10. For applicant's information, **claims 1-3, 5-8, 10-14, and 16-25**, for search purposes, were assumed to produce a tangible result, i.e. displaying the results on a display unit.

Additionally, assuming the 35 USC 101 rejection is overcome by adding a limitation that provides for a tangible result, i.e. by adding a display unit to display the result of the determining plural indexes step, **claims 11-13 and 18** would be allowable for the following reasons: none of the prior art either alone or in combination disclose or teach of the claimed limitations to warrant a rejection under 35 USC 102 or 103.

Specifically regarding **claims 11-13**, none of the prior art either alone or in combination disclose or teach of a corneal topography analysis system as disclosed above, specifically wherein said analysis unit includes means for converting the corneal curvature data entered from

the input unit into a denser first data matrix by interpolation, removing high-frequency components from the data by frequency analysis, and converting obtained data into corneal curvature data in the form of a given second data matrix.

Specifically regarding **claim 18**, none of the prior art either alone or in combination disclose or teach of a corneal topography analysis system as disclosed above, specifically wherein the corneal curvature data entered by the input unit is a polar coordinate data matrix, and wherein said analysis unit converts the corneal curvature data into an orthogonal coordinate data matrix as the first data matrix, removes high-frequency components by two-dimensional FFT from the data, smoothes the obtained corneal curvature data by inverse FFT, and then converts the smoothed data into a polar coordinate data matrix as said second data matrix.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Roberts whose telephone number is (571) 270-1288. The examiner can normally be reached on Monday-Friday 8am-4/5pm with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Mack can be reached on (571) 272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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